

REMARKS

Status of the Claims

Claims 19-26 are pending, with claims 19 and 23 being independent. Claims 19-26 have been amended to even more clearly recite and distinctly claim the present invention. Support for the amendments can be found throughout the specification, including in the original claims; therefore, no new matter has been added.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the foregoing amendments and the following remarks.

Claim Rejections under 35 U.S.C. § 102

Claims 19-26 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 2,450,500 (“Clark”). Applicants respectfully maintain their traversal of this rejection.

Clark relates to controlling the liberation of the large quantities of heat that occurs during the course of the Fischer Tropsch reaction. (Col. 1, lines 40-53). As such, Clark discloses a Fischer Tropsch synthesis process in which hydrocarbons are produced by passing synthesis gas through a plurality of *catalyst zones* in which each catalyst zone contains a synthesis catalyst having an optimum activity for that zone. (Col. 4, lines 43-52). Clark discloses that the catalyst activity is varied from zone to zone such that progressively increasing temperatures are required for each successive zone in the direction of flow of gases therethrough to maintain optimum conversion in each zone for the desired hydrocarbon product. (Col. 4, lines 56-62).

Clark discloses an overall apparatus for the synthesis of hydrocarbons incorporating the successive zones of catalysts (Figures 2 and 3). In the apparatus, Clark discloses that the feed gas contacts *catalyst zones 67, 68, and 69*, and Clark discloses that after the synthesis gas contacts the catalyst zone 67, the reaction proceeds with the evolution of exothermic heat and a corresponding rise in temperature of the gases in the reaction zone. (Col. 9, lines 62-71 and Figure 3). Accordingly, the material in *catalyst zone 67* of Clark is a *Fischer-Tropsch catalyst* that conducts the Fischer Tropsch reaction thereby raising the temperature of the gases in the reaction zone for the following catalyst zones 68 and 69.

In contrast, as recited in independent claim 19, the presently claimed invention relates to an apparatus for a Fischer-Tropsch process comprising a gas inlet, for conducting an inlet gas stream, and at least one product outlet with a reactor there between including a Fischer-Tropsch catalyst, the reactor operable at temperatures of from 175° to 325°C, and a pressure from 1 to 20 atmospheres, and *a material*, included within the reactor and *upstream from the Fischer-Tropsch catalyst*. *The material binds sulfur contained in the inlet gas stream and does not substantially alter synthesis gas*. The specification discloses that the material is used to bind sulfur in the synthesis gas feed, thus preserving catalyst life. (page 10, lines 18 – 19). Accordingly, in the presently claimed invention, the material upstream from the Fischer-Tropsch catalyst is distinct from the Fischer-Tropsch catalyst.

As recited in independent claim 23, the presently claimed invention relates to a process for removing sulfur from a synthesis gas in a Fischer-Tropsch reactor. The Fischer-Tropsch reactor includes a gas inlet for conducting an inlet gas stream, at least one product outlet, and a Fischer-Tropsch catalyst. The process comprises *placing a material* within the inlet gas stream and *upstream from the Fischer-Tropsch catalyst*. *The material binds sulfur contained in the inlet gas stream and does not substantially alter synthesis gas*. A sulfur-containing synthesis gas is passed over the material, thereby removing at least a portion of the sulfur contained in the synthesis gas prior to introducing the synthesis gas to the Fischer-Tropsch catalyst.

To anticipate a claimed invention under §102, a reference must teach each and every element of the claimed invention. *See Lindeman Maschinfabrik GmbH v. American Hoist and Derrick Company*, 221 USPQ 481, 485 (Fed. Cir. 1984).

As described above, Clark discloses an apparatus in which the feed gas contacts successive *catalyst zones 67, 68, and 69*, and Clark discloses that after the synthesis gas contacts the catalyst zone 67, *the reaction proceeds* with the evolution of exothermic heat and a corresponding rise in temperature of the gases in the reaction zone. (Col. 9, lines 62-71). Accordingly, the material in *catalyst zone 67* of Clark is a *Fischer-Tropsch catalyst* that conducts the Fischer Tropsch reaction thereby raising the temperature of the gases in the reaction zone for the following catalyst zones 68 and 69.

It is respectfully submitted that in no way does Clark disclose or suggest an apparatus for a Fischer-Tropsch process comprising a gas inlet and at least one

product outlet with a reactor there between including a Fischer-Tropsch catalyst and *a material*, included within the reactor and upstream from the Fischer-Tropsch catalyst, wherein *the material binds sulfur* contained in the inlet gas stream and *does not substantially alter synthesis gas*.

It is further respectfully submitted that in no way does Clark disclose or suggest a process for removing sulfur from a synthesis gas in a Fischer-Tropsch reactor comprising placing *a material* within the inlet gas stream and *upstream from the Fischer-Tropsch catalyst*, wherein *the material binds sulfur* contained in the inlet gas stream and *does not substantially alter synthesis gas* and passing a sulfur-containing synthesis gas over the material, thereby removing at least a portion of the sulfur contained in the synthesis gas prior to introducing the synthesis gas to the Fischer-Tropsch catalyst.

The Office Action alleges that "the material (67) of Clark is disclosed as being of a material which applicant recognizes as functioning to bind sulfur and not substantially alter synthesis gas. Therefor, there is no structural difference in the apparatus of Clark and that of the instant claims." (Office Action dated April 20, 1995; Page 4).

Applicants respectfully disagree with this assertion. As described above, Clark discloses an apparatus in which the feed gas contacts successive *catalyst zones 67, 68, and 69*. The three serially arranged catalysts 67, 68, and 69 are disclosed by Clark as being *synthesis catalysts*. Accordingly, *the material in catalyst zone 67* of Clark is a *Fischer-Tropsch catalyst* that conducts the Fischer Tropsch reaction thereby raising the temperature of the gases in the reaction zone for the following catalyst zones 68 and 69.

Since the material in catalyst zone 67 is a Fischer-Tropsch catalyst and raises the temperature for the following catalyst zones by conducting the Fischer Tropsch reaction, Applicants respectfully submit that the material in catalyst zone 67 *must* substantially alter synthesis gas and *cannot* be the presently claimed material within the inlet gas stream and upstream from the Fischer-Tropsch catalyst, wherein the material binds sulfur contained in the inlet gas stream and does not substantially alter synthesis gas

As Clark does not teach each and every element of the claims, it cannot anticipate the presently claimed invention. Accordingly, withdrawal of the rejection under 35 U.S.C. § 102(b) is respectfully requested.

Conclusion

Without conceding the propriety of the rejections, the claims have been amended, as provided above, to even more clearly recite and distinctly claim Applicants' invention. For the reasons noted above, the art of record does not disclose or suggest the inventive concept of the present invention as defined by the claims.

In view of the foregoing amendments and remarks, reconsideration of the claims and allowance of the subject application is earnestly solicited. In the event that there are any questions relating to this application, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that prosecution of this application may be expedited.

In the event any further fees are due to maintain pendency of this application, the Examiner is authorized to charge such fees to Deposit Account No. 02-4800.

Respectfully submitted,
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Date: July 19, 2005